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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/804,389	03/13/2001	Jun-Lin Tsai	TS1998083B	6374

7590 05/20/2002  
George O. Saile  
20 McIntosh Drive  
Poughkeepsie, NY 12603

EXAMINER

FARAHANI, DANA

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 05/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/804,389	TSAI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Dana Farahani	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 March 2002.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 12-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
     If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some    \* c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
     \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
     a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 12-20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morishita (U.S. 5,140,400) in view of Frisina et al. (U.S. 5,939,769).

Regarding claims 12 and 20, Morishita discloses, figure 4, an N type silicon body 1 having an upper surface and an N+ buried collector 2 located a first distance below the upper surface and have a thickness. Morishita does not disclose a secondary and a primary base region or an emitter region wholly within the primary base. Frisina discloses, figure 1, a secondary base region 3 comprising P type silicon extending a second distance below the upper surface of the substrate 1; a primary base region 4 of boron-doped P+ silicon, wholly within the secondary base region and extending a third distance below the upper surface of the substrate 1; an emitter region 11 comprises a region of N+ silicon wholly within the primary base region and extending a fourth distance below the upper surface. Furthermore, Frisina discloses that this structure leads to a higher breakdown voltage (see column 3, lines 45-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use this structure in Morishita's invention so the transistor has a higher break down voltage. Morishita, in view of Frisina, discloses the claimed invention except for the use of aluminum instead of boron in the secondary base region. Frisina shows that boron-

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doped base is an equivalent structure known in the art (see column 2, lines 10-12; and column 3, lines 13-14). Therefore, because these two materials were art recognized equivalent at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute boron for aluminum.

Regarding claims 13-19, Morishita, in view of Frisina, discloses the claimed invention except for the specific values for the distance of above regions from the surface of the substrate, and the resistivity of the base region. It would have been an obvious matter of design choice to arrange those regions at the distances specified in the claims, since applicant has not disclosed that the specific values solve any stated problem or is for any particular purpose and it appears that the invention would perform equally well with different values.

### ***Response to Arguments***

3. Applicant's arguments filed on 3/18/02 have been fully considered but they are not persuasive.

The applicant argues that "the collector structure of the present invention is N/N+ whereas that of Frisina, as well as Morishita, is N-/N+". This is not persuasive since N/N+ or N-/N+, both indicate one area of lower dopant concentration adjacent to another area of higher dopant concentration, relative to the first area. Therefore, showing the areas as N/N+ is not patentably distinguishable over the prior art.

Furthermore, the applicant argues that Frisina's base structure differs significantly from that of the present invention because is made to have a substantial

dopant concentration gradient, whereas the secondary base of the present invention has uniformly distributed dopant. This is not found persuasive because uniform gradient distribution is also a gradient distribution of a gradient factor of one.

The applicant also argues it is would not be obvious to substitute boron for aluminum. It has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select boron to be able to have a one gradient factor.

### ***Conclusion***

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (703)305-1914. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703)306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Dana Farahani  
May 16, 2002

  
OLIK CHAUDHURI  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800